Can community energy initiatives motivate sustainable energy behaviours? The role of initiative involvement and personal pro-environmental motivation

Sloot, Daniel; Jans, Lise; Steg, Linda

Published in:
Journal of Environmental Psychology

DOI:
10.1016/j.jenvp.2018.06.007

Publication date:
2018

Can community energy initiatives motivate sustainable energy behaviours? The role of initiative involvement and personal pro-environmental motivation

Daniel Sloot, Lise Jans, & Linda Steg

University of Groningen, The Netherlands

Correspondence concerning this article should be addressed to Daniel Sloot, Department of Psychology, Faculty of Behavioural and Social Sciences, University of Groningen, Grote Kruisstraat 2/1, 9712 TS Groningen, The Netherlands. Email: d.sloot@rug.nl

Word Count: 6,969

Acknowledgements: This research was funded by the 'Topsector Energie en Maatschappij', within the programme 'Energie en Innovatie' (project no. TESA114010). The authors thank Casper Albers for his helpful comments on the analysis of identification levels reported in this paper.

Conflicts of interest: none

Abstract

Community energy initiatives aim to promote sustainable energy behaviours. Personal pro-environmental motivation may influence involvement in these initiatives as well as sustainable energy behaviours. This raises the question whether initiative involvement is uniquely associated with sustainable energy behaviours when accounting for personal pro-environmental motivation. A large-scale questionnaire study among members and non-members of 29 community energy initiatives revealed that different types of personal pro-environmental motivation were indeed related to initiative involvement and sustainable energy intentions and behaviours. Yet, initiative involvement—membership and identification—was generally also uniquely related to sustainable energy intentions and behaviours. Besides, personal pro-environmental motivation and initiative involvement were both uniquely related to broader pro-environmental and communal intentions.

Keywords: community energy initiatives; sustainable energy behaviours; personal pro-environmental motivation; group membership; identification

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1. Introduction

Behavioural changes are needed to reduce environmental problems caused by the current fossil-fuel based energy system (IPCC, 2014; Steg, Perlaviciute, & Van der Werff, 2015). A growing number of initiatives have been set up to promote sustainable energy behaviours in local communities (Middlemiss & Parrish, 2010). Yet, it remains unclear whether people's involvement in these initiatives fosters sustainable energy behaviours.

Many studies have revealed that personal factors motivate sustainable energy behaviours (see Steg et al., 2015, for a review). Initial qualitative evidence suggests that involvement in community energy initiatives may encourage sustainable energy behaviours too (Biddau, Armenti, & Cottone, 2016; Middlemiss, 2011). However, research has focused on members of these initiatives, leaving it open to what extent sustainable energy behaviours result from initiative involvement. Notably, people involved in these initiatives may already be personally motivated to behave sustainably, which may have motivated them to join a community energy initiative too. Hence, the question remains whether initiative involvement can promote sustainable energy behaviours when accounting for individuals' personal pro-environmental motivation.

We will examine whether involvement in a community energy initiative is uniquely related to sustainable energy behaviours when accounting for personal pro-environmental motivation. Furthermore, we will explore whether initiative involvement is associated with broader pro-environmental and communal intentions not explicitly targeted by community energy initiatives.

1.1 Personal Pro-Environmental Motivation

Various types of personal pro-environmental motivation are related to sustainable energy behaviours (Steg et al., 2015). Biospheric values, reflecting concern for protecting

nature and the environment, can motivate people to engage in various pro-environmental behaviours. Yet, as they reflect general pro-environmental goals, they typically relate less strongly to sustainable energy behaviours than specific types of personal pro-environmental motivation (e.g., Van der Werff & Steg, 2016). A more proximate type of personal pro-environmental motivation, rooted in biospheric values, is environmental self-identity, reflecting the extent to which people see themselves as a person who acts pro-environmentally (Van der Werff, Steg, & Keizer, 2013b). Environmental self-identity can encourage sustainable energy behaviours, as people are motivated to behave in line with their self-perceptions (Van der Werff et al., 2013b; Whitmarsh & O'Neill, 2010). Indeed, environmental self-identity is positively related to a wide range of sustainable energy behaviours in households (Gatersleben, Murtagh, & Abrahamse, 2014; Van der Werff, Steg, & Keizer, 2013a, 2013b; Whitmarsh & O'Neill, 2010) and at work (Ruepert et al., 2016), and to involvement in community energy projects (Van der Werff & Steg, 2016). As behaviours are best predicted with motivational factors at a similar level of specificity (the compatibility principle; Ajzen & Fischbein, 1970), a particularly relevant type of personal pro-environmental motivation may be whether people find sustainable energy behaviours personally important. We will examine to what extent these three types of personal pro-environmental motivation are related to sustainable energy behaviours and involvement in community energy initiatives.

1.2 Initiative Involvement

In community energy initiatives, people pursue sustainable energy behaviours as a group, together with other community members. The social identity approach proposes that groups form an important part of people's self-concept (Tajfel & Turner, 1979). When people think of themselves as a group member, the group goals can become internalised, motivating members to behave in line with these goals (Fielding & Hornsey, 2016; Jans & Fielding, in press; Turner, 1991). Because community energy initiatives have the explicit goal to promote

sustainable energy behaviours, involvement in these initiatives is likely to be associated with sustainable energy behaviours, even when accounting for personal pro-environmental motivation.

Besides, in line with social identity principles, shared membership in community energy initiatives may motivate people to influence, and collaborate with, initiative members to realise these group goals (cf. Haslam, 2004). We refer to these behaviours as communal sustainable energy behaviours, to distinguish them from household sustainable energy behaviours. We expect initiative involvement to be uniquely related to communal sustainable energy behaviours when accounting for personal pro-environmental motivation.

Membership in community energy initiatives indicates whether someone is involved in an initiative or not. The extent to which membership motivates sustainable energy behaviours likely depends on the extent to which a person is psychologically involved in the initiative (Tajfel, 1978). This is reflected in initiative identification, that is, a member's solidarity and satisfaction with the initiative, and the centrality of initiative membership to the self (i.e. self-investment; Leach et al., 2008; Postmes, Haslam, & Jans, 2013). Identification can affect the extent to which members behave in line with a group's sustainability goals (Masson & Fritsche, 2014). Hence, while community energy initiative membership may already be uniquely related to sustainable energy behaviours, these relationships are likely to be stronger the more members identify with their initiative.

Biospheric values and environmental self-identity can affect a wide range of pro-environmental behaviours and are thus likely to be related to pro-environmental behaviours not targeted by the initiative, too. We will explore whether initiative involvement may also be associated with pro-environmental and communal behaviours not directly targeted by the initiative. Notably, people may infer that the initiative, as a group, values the environment more generally and therefore intend to behave in line with this broader group value.

Additionally, as shared group membership can encourage cooperative behaviours (Haslam, 2004), initiative involvement may be associated with other communal intentions too.

1.3 Current Research

We conducted a large-scale questionnaire study among members and non-members of community energy initiatives. These initiatives are based in, and limited to, a local community, and run by local volunteers. They are part of a Dutch network of community energy initiatives 'Buurkracht' (translating to 'neighbour power'; Buurkracht, 2018). Buurkracht supports initiatives emerging under its label, for example by providing recruitment flyers and energy saving advice. All initiatives have the declared goal of encouraging sustainable energy behaviours in their community, but choose their own approach to realise this goal. Supplementary Materials A provide further information on Buurkracht.

We studied two indicators of initiative involvement (membership and initiative identification among members), and various indicators of sustainable energy intentions and behaviours. We hypothesise that personal pro-environmental motivation (specifically the more proximate environmental self-identity and importance of sustainable energy behaviour) is positively associated with initiative involvement (H1), energy behaviours (H2a) and household (H2b) and communal (H2c) sustainable energy intentions. Importantly, we hypothesise that, when accounting for the three types of personal pro-environmental motivation, initiative involvement is uniquely positively related to energy behaviours (H3a) and household (H3b) and communal sustainable energy intentions (H3c). We test H3 for both initiative membership and members' initiative identification, and examine at what level of initiative identification members have stronger sustainable energy intentions and behaviours than non-members. Lastly, we explore to what extent personal pro-environmental motivation and initiative involvement are uniquely related to pro-environmental intentions not explicitly targeted by the initiatives (Q1), and to communal intentions not related to sustainable energy

(Q2), and at what level of members' initiative identification these intentions are stronger for members than non-members.

2. Method

2.1 Procedure and Participants

We randomly selected 29 community energy initiatives from the overarching network of, at that time, 85 Buurkracht initiatives. All selected initiatives had organised at least one official meeting and had five members at minimum. In these communities, we approached everyone signed up to the initiative's online website[1] and a comparable group of non-members (the first right-door neighbour who was not a member) for our study. We approached 2410 households, and asked one adult resident to complete the questionnaire. Questionnaires were collected at a date agreed upon or sent back in a response envelope. Participants received no compensation, but their community could win a prize draw.

We received 568 filled-in questionnaires (response rate: 24%, ranging from 10% to 47% across communities). Response rate was similar for members (53%) and non-members (47%). Mean age was 56.54 (*SD* = 13.99), with no difference between members and non-members, $p = .569$). Thirty percent of participants had finalised high school or vocational education, while 70% had finalised college or university education, with no differences between member and non-members, $p = .073$. The median household income per month was 3000 to 4000€, with no differences between members and non-members, $p = .082$. Gender differed between members (31% female) and non-members (42% female), $\chi^2(1) = 6.07$, $p = .014$. Controlling for these socio-demographic differences did not change the pattern of results. Generally, members believed their initiative aimed to promote sustainable energy behaviours.[2]

2.2 Measures

For all measures, we computed mean scores across items, unless otherwise specified (see Table 1 for descriptive statistics).

Biospheric values were measured by four items, as part of a brief value scale (e.g., "Protecting the environment: preserving nature"; α = .84; Steg, Perlaviciute, Van der Werff, & Lurvink, 2014). Participants indicated the extent to which each value was a guiding principle in their life; scores could range from -1 '*opposed to my values*' to 7 '*extremely important*'.

Environmental self-identity was measured by three items (e.g., "I am the type of person who acts environmentally-friendly"; Van der Werff et al., 2013a; α = .87); scores could range from 1 '*completely disagree'* to 7 '*completely agree'*.

Personal importance of sustainable energy behaviour was measured by three items: "I find it important to be conscious about my energy behaviour"; "I find it important to save energy"; "I find it important to use more sustainable energy" (α = .78). Scores could range from 1 '*completely disagree'* to 7 '*completely agree'*.

Initiative membership: Participants indicated they were a member of the Buurkracht initiative in their neighbourhood or not.

Initiative identification was measured by four items (e.g., "I identify with my Buurkracht initiative"; Postmes et al., 2013; α = .87); scores could range from 1 '*completely disagree'* to 7 '*completely agree'*.

Self-reported energy behaviour was measured as overall energy savings: "To what extent did you reduce your energy consumption over the past six months"; scores could range from 1 '*not at all*' to 7 '*very much*'. We also measured two specific energy behaviours: average thermostat setting (in °C) and percentage of energy-efficient appliances in one's household[3]. Besides, participants indicated whether they had implemented six fossil energy-saving measures: solar panels, double glazing, roof, floor, and wall insulation, and other energy-saving measures); scores could thus range from 0 (no measures implemented) to 6 (all measures implemented). All self-reported sustainable energy behaviours were directly targeted by Buurkracht (Buurkracht, 2018). Similar to earlier studies (e.g., Thøgersen, 2004;

Whitmarsh & O'Neill, 2010), these behaviours did not form a reliable scale ($\alpha = .34$), and were analysed separately.

Household sustainable energy intentions were measured by five items: intention to lower one's overall energy consumption; to use more sustainable energy sources; to lower the thermostat, to take shorter showers, and to replace household appliances with more energy-efficient ones ($\alpha = .82$). Scores could range from 1 '*not at all*' to 7 '*very much*'.

Communal sustainable energy intentions: Participants indicated to what extent they intend to motivate others in their local community to save energy, and to save energy together with other people in their community ($\rho_{SB} = .77$). Scores could range from 1 '*not at all*' to 7 '*very much*'.

Other pro-environmental intentions not explicitly targeted by the community energy initiatives were measured with three items: intention to reduce car use; intention to buy environmentally-friendly products; and intention to donate money to environmental organisations. Scores could range from 1 '*not at all*' to 7 '*very much*'. As these items captured rather different pro-environmental intentions, scale reliability was low ($\alpha = .58$); we analysed them separately.

Other communal intentions not related to sustainable energy were measured by two items: "To what extent do you intend to do fun things with other people in your community, not related to energy"; "To what extend do you intend to set up other initiatives in your community, not related to energy" ($\rho_{SB} = .74$). Scores could range from 1 '*not at all*' to 7 '*very much*'.

Table 1. Descriptive statistics and difference tests for members and non-members

	Non-Members		Members		
	M	*SD*	*M*	*SD*	Cohen's *d*
Biospheric values	5.15[a]	1.21	5.27[a]	1.07	0.11
Environmental self-identity	4.53[a]	1.19	4.84[b]	1.07	0.27
Personal importance	5.26[a]	1.00	5.55[b]	0.85	0.31
Initiative identification	-	-	3.56	1.26	-
Self-reported energy behaviours					
- Overall energy savings	3.80[a]	1.63	4.49[b]	1.49	0.44
-Thermostat temperature (°C)	19.77[a]	1.03	19.54[b]	1.03	-0.22
- Energy-efficient appliances (%)	45.36[a]	26.50	54.47[b]	24.37	0.36
- Energy-saving measures (0 - 6)	2.49[a]	1.54	3.02[b]	1.40	0.36
Household sustainable energy intentions	4.28[a]	1.35	4.58[b]	1.13	0.24
Communal sustainable energy intentions	2.93[a]	1.34	3.99[b]	1.47	0.75
Other pro-environmental intentions					
- Reducing car use	3.48[a]	1.72	3.73[a]	1.51	0.16
- Buying environmentally-friendly products	4.69[a]	1.47	5.12[b]	1.18	0.33
- Donating to environmental organisations	3.02[a]	1.67	3.36[b]	1.73	0.20
Other communal intentions	3.12[a]	1.43	3.54[b]	1.38	0.30

Note. Different superscripts in rows indicate a statistically significant difference between members and non-members ($p < .05$).

3. Results

As individuals were nested in local communities, we conducted multilevel regression analyses using MPlus (Muthén & Muthén, 2007). Intra-class correlations (ICC) were very low (with the exception of energy-saving measures; see Supplementary Materials B). Multilevel estimates thus likely resemble individual-level estimates. For accuracy of model estimates we used multilevel analyses with random intercepts. Overall, our proposed models fit the data better than two alternative models specifying initiative involvement as an outcome (see Supplementary Materials C).

As expected (H1), a multilevel logistic regression showed that people with stronger personal pro-environmental motivation were more likely to be an initiative member (see Table 2). Yet, these relationships were relatively weak, and only the importance people placed

in sustainable energy was significantly related to initiative membership, while environmental self-identity and biospheric values were not. Among initiative members, personal pro-environmental motivation was positively associated with members' identification with the initiative (H1; Table 3). Specifically, stronger environmental self-identity and personal importance of sustainable energy behaviour, but not biospheric values, were positively associated with stronger initiative identification (H1; Table 3). This stretches the importance of investigating whether initiative membership and identification are uniquely related to sustainable energy behaviours and intentions when accounting for personal pro-environmental motivation.

Table 2. Relationships between personal pro-environmental motivation and initiative membership

	Initiative membership			
	β	95% CI	*t*(557)	Odds ratio
Biospheric values	-.10	[-.22; .02]	-1.62	0.85
Environmental self-identity	.11	[-.02; .24]	1.73	1.20
Personal importance	.15	[.03; .28]	2.44*	1.36
Pseudo-R²		.04		

Note. Correctly classified: 59%, baseline: 53%; * $p < .05$

Table 3. Relationship between personal pro-environmental motivation and initiative identification of members

	Initiative identification		
	β	95% CI	*t*(285)
Biospheric values	.05	[-.09; .18]	0.72
Environmental self-identity	.16	[.01; .31]	2.08*
Personal importance	.24	[.11; .38]	3.51***
R²		.16	

Note: * $p < .05$; *** $p < .001$

As expected, personal pro-environmental motivation was significantly related to self-reported energy behaviours (H2a; see Table 4, Step 1), and to household (H2b) and communal

sustainable energy intentions (H2c; see Table 5, Step 1). Specifically, stronger personal importance of sustainable energy behaviours was related to saving more energy, having more energy-efficient appliances, more energy-saving measures implemented, lower thermostat setting, and stronger household and communal sustainable energy intentions. Environmental self-identity was also positively associated with some of the self-reported energy behaviours, and with both household and communal sustainable energy intentions. Biospheric values were associated with energy-efficient appliances only (negatively).

As expected, membership was uniquely and significantly related to all self-reported energy behaviours (H3a; Table 4, Step 2), and to communal (H3c), but not household sustainable energy intentions (H3b; Table 5). Initiative members generally reported more sustainable energy behaviours and stronger communal sustainable energy intentions than non-members. Moreover, the relevant types of personal pro-environmental motivation remained significantly related to the behaviours and intentions.

Among members, initiative identification was uniquely and positively related to overall energy savings but not to thermostat setting, the percentage of energy-efficient appliances owned, and the number of energy saving measures implemented (Table 6, Step 2), providing partial support for H3a. Furthermore, initiative identification was uniquely and positively related to household and particularly communal sustainable energy intentions, supporting H3b and H3c (Table 7, Step 2). Generally, personal pro-environmental motivation remained uniquely significantly related to sustainable energy behaviours and intentions, with the exception of personal importance of sustainable energy behaviour that was no longer significantly related to communal sustainable energy intentions (see Tables 6 and 7, Step 1 and 2).

Table 4. Relationship personal pro-environmental motivation and initiative membership with self-reported energy behaviours (full sample)

	Overall energy savings						Thermostat temperature					
	Step 1			Step 2			Step 1			Step 2		
	β	95% CI	*t*(532)	β	95% CI	*t*(528)	β	95% CI	*t*(532)	β	95% CI	*t*(528)
Biospheric values	-.03	[-.13; .08]	-0.50	-.01	[-.11; .09]	-0.22	.08	[-.03; .19]	1.42	.07	[-.04; .18]	1.30
Environmental self-identity	.14	[.03; .24]	2.42*	.12	[.01; .23]	2.14*	-.03	[-.15; .08]	-0.56	-.02	[-.14; .09]	-0.39
Personal importance	.24	[.14; .35]	4.52***	.22	[.12; .33]	4.14***	-.16	[.03; .24]	-2.76**	-.15	[-.26; -.03]	-2.55*
Initiative membership				.16	[.08; .24]	4.14***				-.10	[-.18; -.01]	-2.23*
ΔR^2		.11			.03			.02			.01	

Note: * $p < .05$; ** $p < .01$; *** $p < .001$

Table 4 (cont.). Relationship personal pro-environmental motivation and initiative membership with self-reported energy behaviours (full sample)

	Energy-efficient appliances						Energy-saving measures					
	Step 1			Step 2			Step 1			Step 2		
	β	95% CI	*t*(532)	β	95% CI	*t*(528)	β	95% CI	*t*(532)	β	95% CI	*t*(528)
Biospheric values	-.15	[-.26; -.04]	-2.69**	-.13	[-.24; -.03]	-2.46*	.02	[-.09; .12]	0.29	.03	[-.08; .14]	0.53
Environmental self-identity	.15	[.03; .27]	2.49*	.14	[.02; .26]	2.29**	-.06	[-.18; .06]	-0.98	-.08	[-.19; .04]	-1.26
Personal importance	.29	[.17; .40]	4.93***	.27	[.16; .38]	4.64***	.19	[.08; .30]	3.31***	.17	[.06; .28]	2.95**
Initiative membership				.13	[.05; .22]	3.03**				.17	[.09; .25]	3.99***
ΔR^2		.11			.02			.03			.03	

Note: * $p < .05$; ** $p < .01$; *** $p < .001$

Table 5. Relationship personal pro-environmental motivation and initiative membership with household and communal sustainable energy intentions (full sample)

	Household sustainable energy intentions						Communal sustainable energy intentions					
	Step 1			Step 2			Step 1			Step 2		
	β	95% CI	*t*(543)	β	95% CI	*t*(541)	β	95% CI	*t*(543)	β	95% CI	*t*(541)
Biospheric values	.09	[.00; .19]	1.95	.10	[.01; .20]	2.19*	.02	[-.09; .12]	0.30	.05	[-.05; .14]	0.96
Environmental self-identity	.16	[.06; .26]	3.15**	.16	[.06; .26]	3.05**	.22	[.11; .33]	3.99***	.19	[.09; .30]	3.61***
Personal importance	.32	[.22; .41]	6.44***	.32	[.23; .42]	6.66***	.15	[.05; .26]	2.80**	.12	[.02; .22]	2.35**
Initiative membership				.04	[-.03; .12]	1.15				.31	[.23; .38]	8.34***
ΔR^2		.25			.02			.12			.10	

Note: * $p < .05$; ** $p < .01$; *** $p < .001$

Table 6. Relationship personal pro-environmental motivation and initiative identification with self-reported energy behaviours (initiative members only)

	Overall energy savings						Thermostat temperature					
	Step 1			Step 2			Step 1			Step 2		
	β	95% CI	*t*(268)	β	95% CI	*t*(257)	β	95% CI	*t*(268)	β	95% CI	*t*(257)
Biospheric values	.03	[-.11; .17]	0.45	.03	[-.11; .17]	0.42	.12	[-.02; .27]	1.73	.14	[-.01; .28]	1.85
Environmental self-identity	-.02	[-.18; .14]	-0.23	-.06	[-.21; .10]	-0.73	-.15	[-.31; .01]	-1.84	-.17	[-.33; -.01]	-2.03*
Personal importance	.26	[.12; .40]	3.60***	.19	[.04; .33]	2.57*	-.08	[-.23; .07]	-1.09	-.11	[-.26; .05]	-1.36
Initiative identification				.27	[.16; .39]	4.65***				.05	[-.08; .18]	0.76
ΔR^2		.07			.05			.03			.01	

Note: * $p < .05$; ** $p < .01$; *** $p < .001$

Table 6 (cont.). Relationship personal pro-environmental motivation and initiative identification with self-reported energy behaviours (initiative members only)

	Energy-efficient appliances						Energy-saving measures					
	Step 1			Step 2			Step 1			Step 2		
	β	95% CI	*t*(268)	β	95% CI	*t*(257)	β	95% CI	*t*(268)	β	95% CI	*t*(257)
Biospheric values	-.22	[-.37; -.08]	-2.94**	-.21	[-.36; -.06]	-2.72**	.06	[-.08; .20]	0.80	.07	[-.07; .22]	0.99
Environmental self-identity	.09	[-.08; .26]	1.09	.08	[-.09; .25]	0.93	-.12	[-.28; .04]	-1.45	-.14	[-.30; .03]	-1.62
Personal importance	.33	[.18; .47]	4.39***	.31	[.15; .46]	3.96***	.21	[.07; .36]	2.83**	.18	[.03; .33]	2.39*
Initiative identification				.06	[-.07; .19]	0.86				.12	[-.01; .24]	1.78†
ΔR^2		.11			.00			.03			.02	

Note: * $p < .05$; ** $p < .01$; *** $p < .001$; † $p < .10$

Table 7. Relationship personal pro-environmental motivation and initiative identification with household and communal sustainable energy intentions (initiative members only)

	Household sustainable energy intentions						Communal sustainable energy intentions					
	Step 1			Step 2			Step 1			Step 2		
	β		*t*(284)	β		*t*(275)	β		*t*(284)	β		*t*(275)
Biospheric values	.03	[-.10; .15]	0.40	.03	[-.09; .16]	0.51	.00	[-.13; .14]	0.01	-.01	[-.12; .10]	-0.13
Environmental self-identity	.23	[.09; 37]	3.30**	.20	[.06; .34]	2.88**	.19	[.04; .34]	2.49*	.08	[-.04; .21]	1.34
Personal importance	.31	[.15; .43]	4.89***	.28	[.15; .40]	4.29***	.18	[.04; .32]	2.55*	.02	[-.09; .14]	0.42
Initiative identification				.16	[.05; .27]	2.81**				.62	[.54; .70]	15.19***
ΔR^2		.25			.04			.11			.33	

Note: * $p < .05$; ** $p < .01$; *** $p < .001$

We explored at what level of identification members are more likely to (intend to) engage in sustainable energy behaviours than non-members, using a graphical solution.[4] We only examined the sustainable energy intentions and behaviours that were significantly related to members' initiative identification. For each sustainable energy intention and behaviour, we plotted non-members' average score on this measure as a horizontal line, with a 95% confidence interval. We plotted members' predicted value on the intention or behaviour depending on their initiative identification scores as a regression line, with a 95% confidence interval. Both lines were computed accounting for the relationships of personal pro-environmental motivation with the intention or behaviour. The point at which the two confidence intervals cross in the graphs is a conservative ($p \approx .01$) estimate of the level of identification where members are more likely to (intend to) engage in the relevant behaviour than non-members (the graphical procedure is shown in Supplementary Materials D). Table 8 shows that members' sustainable intentions and behaviours tend to be higher than those of non-members even when members did not strongly identity with the initiative. With the exception of household sustainable energy intentions, the majority of members score at or above these critical levels of identification.

Table 8. Critical levels of initiative identification above which members engage in more sustainable energy behaviours and have stronger intentions than non-members

	Critical level of identification	*% of members scoring ≥ critical level*
Overall energy savings	2.80	68%
Household sustainable energy intentions	4.00	31%
Communal sustainable energy intentions	2.60	74%

Regarding exploratory Question 1, regression analysis revealed that environmental self-identity was positively related to intentions to reduce car use, intention to buy environmentally-friendly products, and intention to donate money to environmental organisations, while biospheric values and personal importance were only significantly

associated with the intention to buy environmentally-friendly products (Table 9, Step 1). In the second step, initiative membership was only uniquely positively related to the intention to buy environmentally-friendly products; the three types of personal pro-environmental motivations remained significantly related to this intention (Q1, Table 9). Among initiative members, stronger initiative identification was uniquely and positively related to the intention to buy environmentally-friendly products (Q1; Table 10). Environmental self-identity remained uniquely and positively related to all pro-environmental intentions when initiative identification was added to the model, although the relation between biospheric values and buying environmental-friendly products became non-significant (Table 10; Step 2). The level of identification needs to be only moderate for members to have stronger intentions to buy environmentally-friendly products than non-members (critical level = 3.10; 62% of initiative members identified at or above this level).

Table 9. Relationship personal pro-environmental motivation and initiative membership with other pro-environmental and communal intentions (full sample)

	Reducing car use						Buying environmentally-friendly products					
	Step 1			Step 2			Step 1			Step 2		
	β	95% CI	*t*(535)	β	95% CI	*t*(532)	β	95% CI	*t*(535)	β	95% CI	*t*(532)
Biospheric values	-.04	[-.15; .07]	-0.75	-.04	[-.14; .07]	-0.72	.10	[.01; .19]	2.08*	.11	[.02; .20]	2.36*
Environmental self-identity	.30	[.18; .41]	5.14***	.30	[.18; .41]	5.13***	.20	[.10; .30]	3.86***	.19	[.09; .29]	3.73***
Personal importance	-.01	[-.12; .11]	-0.14	-.01	[-.12; .11]	-0.09	.30	[.20; .40]	6.11***	.30	[.20; .39]	6.07***
Initiative membership				.00	[-.08; .08]	0.03				.08	[.01; .15]	2.17*
ΔR^2		.07			.00			.27			.02	

Note: * $p < .05$; ** $p < .01$; *** $p < .001$

Table 9 (cont.). Relationship personal pro-environmental motivation and initiative membership with other pro-environmental and communal intentions (full sample)

	Donating to environmental organisations						Other communal intentions					
	Step 1			Step 2			Step 1			Step 2		
	β	95% CI	*t*(535)	β	95% CI	*t*(532)	β	95% CI	*t*(548)	β	95% CI	*t*(547)
Biospheric values	.05	[-.05; .16]	1.03	.06	[-.04; .16]	1.13	.03	[-.01; .14]	0.54	.04	[-.07; .15]	0.75
Environmental self-identity	.26	[.15; .37]	4.54***	.25	[.14; .36]	4.44***	.12	[.01; .24]	2.05*	.11	[-.01; .23]	1.85
Personal importance	.05	[-.06; .16]	0.94	.05	[-.06; .16]	0.85	.09	[-.03; .20]	1.50	.07	[-.04; .18]	1.21
Initiative membership				.05	[-.03; .13]	1.20				.13	[.04; .21]	3.02**
ΔR^2		.11			.00			.04			.02	

Note: * $p < .05$; ** $p < .01$; *** $p < .001$

Table 10. Relationship environmental self-identity and initiative identification with other pro-environmental and communal intentions (initiative members only)

	Reducing car use						Buying environmentally-friendly products					
	Step 1			Step 2			Step 1			Step 2		
	β	95% CI	*t*(276)	β	95% CI	*t*(266)	β	95% CI	*t*(276)	β	95% CI	*t*(266)
Biospheric values	-.04	[-.19; .10]	-0.58	-.04	[-.19; .10]	-0.59	-.14	[-.27; -.01]	-2.04*	-.13	[-.26; .00]	-1.92
Environmental self-identity	.21	[.05; .37]	2.50*	.18	[.02; .35]	2.15*	.38	[.23; .52]	5.15***	.36	[.21; .50]	4.85***
Personal importance	.05	[-.11; .20]	0.59	.01	[-.15; .17]	0.12	.11	[-.04; .25]	1.40	.11	[-.04; .26]	1.45
Initiative identification				.12	[-.01; .24]	1.85†				.12	[.004; .23]	2.03*
ΔR^2		.05			.01			.15			.03	

Note. * $p < .05$; ** $p < .01$; *** $p < .001$; † $p < .10$

Table 10 (cont.). Relationship environmental self-identity and initiative identification with other pro-environmental and communal intentions (initiative members only)

	Donating to environmental organisations						Other communal intentions					
	Step 1			Step 2			Step 1			Step 2		
	β	95% CI	*t*(276)	β	95% CI	*t*(266)	β	95% CI	*t*(290)	β	95% CI	*t*(282)
Biospheric values	.00	[-.14; .14]	0.04	-.01	[-.15; .13]	-0.14	.02	[-.12; .16]	0.30	.02	[-.11; .15]	0.23
Environmental self-identity	.32	[.17; .47]	4.14***	.30	[.15; .45]	3.88***	.11	[-.05; .27]	1.12	.04	[-.11; .19]	0.51
Personal importance	.04	[-.04; .25]	0.56	.02	[-.13; .17]	0.28	.09	[-.06; .23]	1.14	-.04	[-.17; .10]	-0.53
Initiative identification				.12	[-.01; .24]	1.85†				.47	[.37; .57]	8.92***
ΔR^2		.12			.01			.04			.19	

Note. * $p < .05$; ** $p < .01$; *** $p < .001$; † $p < .10$

Regarding exploratory Question 2, environmental self-identity was associated with a stronger intention to do things with the community not directly related to sustainable energy (Table 9, Step 1). In Step 2, initiative membership was uniquely and positively related to other communal intentions, while the effect of environmental self-identity was no longer significant (Q2; Table 9, Step 2). Among initiative members, identification was positively associated with other communal intentions (Q2; Table 10, Step 2), while there was no significant association between personal pro-environmental motivation and other communal intentions at any step. Initiative members had significantly stronger communal intentions than non-members when their level of identification was 3.40 or higher, which applied to 54% of initiative members in our sample.

4. Discussion

We examined whether involvement in community energy initiatives is uniquely associated with sustainable energy intentions and behaviours when accounting for various types of personal pro-environmental motivation. Our results reveal personal pro-environmental motivation increases the likelihood that people are involved in community energy initiatives, as reflected in both initiative membership and identification (H1), and is positively related to self-reported sustainable energy behaviours, and household and communal sustainable energy intentions (H2a-c). This highlights the importance of accounting for personal pro-environmental motivation when examining the relationship between initiative involvement and sustainable energy intentions and behaviours.

Importantly, as expected, initiative involvement was generally uniquely associated with sustainable energy intentions and behaviours when accounting for the three types of personal pro-environmental motivation. Specifically, initiative membership was uniquely related to self-reported energy behaviours (H3a) and communal sustainable energy intentions (H3c), but not to household sustainable energy intentions (H3b). Furthermore, among members, higher initiative identification was uniquely associated with some of the self-

reported energy behaviours (H3a), and to stronger household (H3b) and communal (H3c) sustainable energy intentions when accounting for personal pro-environmental motivation. Interestingly, the level of identification could be low for initiative members to (intend to) engage in more sustainable energy behaviours than non-members, and typically the majority of members identified at this level. Initiative involvement was not only related to sustainable energy intentions and behaviours explicitly targeted by the community energy initiative, but also to buying environmentally-friendly products (but not to other pro-environmental intentions) and communal intentions unrelated to sustainable energy. Overall, our findings show that both personal pro-environmental motivation and initiative involvement are uniquely related to a range of sustainable energy intentions and behaviours, and to broader pro-environmental and communal intentions. Importantly, we find these findings rather consistently for different indicators of initiative involvement, when accounting for three types of personal pro-environmental motivations, and across a range of sustainable intentions and behaviours.

Our findings have important theoretical implications. First, personal importance of sustainable energy behaviour was typically more strongly related to initiative involvement and sustainable energy intentions and behaviours than environmental self-identity and particularly biospheric values. In contrast, environmental self-identity was more strongly related to other pro-environmental intentions compared to the more specific personal importance of sustainable energy behaviour. Biospheric values were only weakly or not related to these intentions and behaviours. These findings indicate that consistent with the compatibility principle (Ajzen & Fischbein, 1970), motivations are more strongly related to behaviour when both are conceptualised at a similar level of specificity.

Second, our finding that initiative involvement is uniquely related to sustainable energy intentions and behaviours, other communal intentions, and, to a limited extent, to other pro-environmental intentions extends research on the effects of group involvement on

members' behaviour in important ways. Notably, in contrast to previous research (e.g., Bartels & Onwezen, 2014; Dono, Webb, & Richardson, 2010), we accounted for personal pro-environmental motivation when examining the relation between group involvement and sustainable energy intentions and behaviours. This eliminates the possibility that effects of group involvement on behaviour are mere artefacts of one's personal pro-environmental motivation, which is particularly important as personal motivation is related to involvement. Next, extending previous research, we examined both membership and members' initiative identification, and showed initiative identification does not have to be strong for sustainable intentions and behaviour to be stronger among members compared to non-members.

Third, our findings indicate that initiative involvement may be linked to broader outcomes, including intentions to engage in pro-environmental behaviours not directly targeted by community energy initiatives (though these relationships were relatively weak), and to communal intentions not related to sustainable energy. Future research could examine why initiative involvement can be associated with such broader outcomes. For example, it may be that initiative members infer broader environmental values next to the initiative's main goal to encourage sustainable energy behaviours, and act in accordance with these values. Moreover, involvement may particularly motivate collaboration between members, thus leading to stronger other communal intentions.

Our study has certain limitations and our results raise interesting new questions. Future research is needed before strong conclusions can be drawn about the extent to which community energy initiatives can function as a motivator for sustainable energy behaviours. First, while the external validity of our findings is high, as the study took place among members and non-members of real community energy initiatives, our correlational design implies we cannot draw firm conclusions on causality. Yet, alternative causal models assuming initiative involvement as an outcome seem theoretically less plausible, and generally fit the data worse than our proposed model (see Supplementary Materials C).

Furthermore, (experimental) research has provided support for the proposed causal relationships between some of the model variables, such as the effect of values (Thøgersen & Ölander, 2002), environmental self-identity (Van der Werff et al., 2013a), and group identification (Masson & Fritsche, 2014), respectively, on sustainable behaviours. Future research is needed to examine causality further using experimental or longitudinal designs, to causal relations between personal pro-environmental motivation, initiative involvement, and sustainable energy intentions and behaviours.

Second, even though we found a consistent relationship between initiative involvement and a range of sustainable energy intentions and behaviours, and for two indicators of involvement, the effect sizes were generally small. Therefore, replication studies are needed in different samples, initiatives and countries. Furthermore, the strength of the relationships seemed to differ somewhat for initiative membership and identification. Future research could further investigate how different indicators of initiative involvement are related to different types of intentions and behaviours, and study which factors explain the strength of such relationships. Such studies could also include other indicators of initiative involvement, such as members' role in the initiative, the time of joining, or the degree of contact with initiative members.

Third, we used well-validated scales to measure our key constructs whenever possible, but our particular research context required us to develop some new measures, such as communal sustainable energy intentions. As our results suggest initiative involvement to be particularly strongly related to such communal outcomes, these measures should be developed and validated further.

Fourth, we focused on whether initiative involvement affects sustainable energy intentions and behaviours, but did not systematically consider which factors motivate initiative involvement in the first place. This is an important topic for future research. The three types of personal pro-environmental motivation included in our study were only weakly

related to initiative involvement, suggesting that other motivational factors are at play here too.

Our findings suggest that stimulating involvement in community energy initiatives could promote individuals' sustainable energy intentions and behaviours. Making people join a community energy initiative can be a first important step, but our results indicate that members need to identify at least somewhat with the initiative to engage in more household and communal sustainable energy behaviours, and pro-environmental and communal behaviours more generally, compared to non-members. Future research is needed to test which interventions are most effective to promote membership and initiative identification, and whether these in turn encourage sustainable behaviour among members.

In conclusion, personal pro-environmental motivation and involvement in community energy initiatives are both positively and uniquely related to sustainable energy intentions and behaviours, and may even be linked to broader outcomes, such as other pro-environmental and communal intentions. As such, involvement in community energy initiatives may not only promote a sustainable energy transition, but also the sustainability of communities more generally.

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Footnotes

1 As one community initiative had more than 380 members, we drew a random sub-sample of 100 initiative members, otherwise the procedure was the same as for the other communities.

2 Initiative members completed three items, equivalent to the measure of *personal* importance of sustainable energy behaviour, phrased on the initiative level (e.g., Members of my Buurkracht initiative find it important to save energy; α =.80) on a scale from 1 = *completely disagree* to 7 = *completely agree*). A one-sample t-test showed members rated these items on average higher (M = 5.38, SD = 0.84) than the scale mid-point of 4, $t(294)$ = 28.44, $p < .001$, suggesting that members indeed think their initiative has the goal to promote sustainable energy behaviours.

3 Average showering time in minutes was also measured, but showed a substantial non-normal distribution with multiple peaks and a severe skew. Therefore, we dropped it from analyses.

4 To ease computations, we did not control for nested data structure in this analysis, as ICC values were low. For this analysis, we consulted Dr. C. Albers (personal communication, 2 February 2018).